

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA

SPACE SYSTEMS/LORAL, INC.,

No. C 96-03418 SI

Plaintiff,

**ORDER GRANTING DEFENDANT'S
MOTION FOR RECONSIDERATION OF
CLAIM CONSTRUCTION**

v.

LOCKHEED MARTIN CORP.,

Defendant.

Presently before the Court is defendant Lockheed Martin Corp.'s ("Lockheed") motion for reconsideration of claim construction.¹ Having considered the parties' arguments and the papers submitted, and for good cause appearing, the Court GRANTS defendant's motion.

BACKGROUND

Plaintiff, Space Systems/Loral, Inc. ("SSL"), is the owner of the patent at issue, U.S. Patent No. 4,537,375 ("the '375 patent"). SSL filed this patent infringement suit against Lockheed in 1995, adding claims for infringement of the '375 patent in 1998.

As this Court has described in its previous orders, the '375 patent discloses an improved method of performing satellite "station-keeping" maneuvers. The Federal Circuit has described the '375 patent as follows:

Loral is the owner of the '375 patent for an improved method of maintaining the orientation and attitude of a satellite in space. Satellites in orbit around the earth tend to

¹After the Court announced its tentative ruling at oral argument, counsel for plaintiff requested the opportunity to file supplemental briefing addressing the Court's proposed construction of "net position error." Further briefing was thereafter received both from plaintiff and from defendant.

be pulled out of their proper position by the gravitational effects of the sun, earth, and moon. To maintain the requisite position the satellite conducts “station-keeping maneuvers” by firing its thrusters, based upon measurements of its position. However, the station-keeping maneuvers may over-correct or may introduce new errors in position and orientation, and the general procedure has been to conduct a second firing to correct the errors of the first firing. These procedures require fuel, the on-board supply of which is limited, and limits the useful life of the satellite. The ’375 patent is directed to a method of reducing the fuel consumption during station-keeping, by enhancing the efficiency of the corrective procedure.

According to the ’375 patent, the satellite first estimates the probable correction based on historical data from prior station-keeping maneuvers, and conducts a first firing of the thrusters based on the estimated correction. This is called the “prebias” step of the modulating response. After the prebias firing, the satellite measures the remaining actual error in its position, adds the actual error to the historical error, and conducts a second firing. This procedure overall uses less fuel than the prior method whereby a first firing was calculated to attempt full correction, followed by a second firing. The fuel saving that is achieved extends the life of the satellite.

Space Sys. v. Lockheed Martin Corp., 405 F.3d 985, 987 (Fed. Cir. 2005); *see also Space Sys. v. Lockheed Martin Corp.*, 271 F.3d 1076, 1077-78 (Fed. Cir. 2001).

At issue in the current motion is this Court’s construction of two terms in Claim 1 of the ’375 patent. First, the parties dispute the meaning of what they refer to as “step [b]” of claim 1; second, the parties dispute the meaning of the term “net position error.” Claim 1 reads as follows:

1. For use in a spacecraft during a change in velocity maneuver, the spacecraft employing a plurality of thrusters, at least a first thruster and a second thruster being disposed to develop mutually counteractive moment arms of thrust relative to at least one axis through a center of mass of the spacecraft, said first thruster and said second thruster being capable of developing unequal moment arms of force, a method for counteracting disturbance transients comprising the steps of:
 - [a] storing prior to said maneuver a value representative of an estimated disturbance torque;
 - [b] modulating in response to said stored value one of said first and second thrusters during said maneuver to counteract an actual disturbance torque a sufficient amount to compensate for said actual disturbance torque in order to minimize a net position error without initially detecting said net position error; thereafter
 - [c] detecting said net position error, said net position error being indicative of a difference between said estimated disturbance torque and said actual disturbance torque with respect to said axis; and thereafter
 - [d] modulating in response to a sum of said stored value and said net position error one of said first and second thrusters during said maneuver to counteract said actual disturbance torque to further minimize said net position error.

’375 patent, col. 9, lines 7-33 (emphases and bracketed step delineations added).

The Court has twice before addressed the construction of the terms at issue in the current motion.

1 On September 17, 1999, the Court held a *Markman* hearing that resulted in a claim construction order
 2 dated October 18, 1999. That order construed “net position error” to mean “an attitude error arising
 3 after a modulated firing of a thruster pair.” Based on the patent’s prosecution history, however, the
 4 Court limited step [b] by prohibiting the first thruster modulation from being based on “position error
 5 in general.”

6 On April 16, 2002, the Court issued an order in response to a motion for reconsideration of its
 7 prior claim construction order. In that order the Court refused defendant’s request to reexamine its
 8 construction of “net position error.” However, the Court granted SSL’s motion to reconsider the
 9 construction of step [b]. The Court abandoned its earlier limitation on step [b], finding that it had
 10 erroneously interpreted the prosecution history, and removed the limitation that the first thruster
 11 modulation could not be based on position error in general. Thus, the Court construed step [b] to cover
 12 “modulating in response to the stored value without reference to or depending upon net position error.”

13 Following this second claim construction order, the Court granted summary judgment in favor
 14 of defendant, finding that the ’375 patent was invalid because it violated the written description
 15 requirement. In April 2005, the Federal Circuit reversed and remanded. In light of the Federal Circuit’s
 16 decision, Lockheed now moves for the Court to reconsider its claim construction orders. The Court
 17 GRANTS Lockheed’s motion.

18 19 LEGAL STANDARD

20 “[T]he claims of a patent define the invention to which the patentee is entitled the right to
 21 exclude.” *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir.
 22 2004); *see also Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996) (“[W]e look
 23 to the words of the claims themselves . . . to define the scope of the patented invention.”); *Markman v.*
 24 *Westview Instruments, Inc.*, 52 F.3d 967, 980 (Fed. Cir. 1995), *aff’d*, 517 U.S. 370, 116 S. Ct. 1384
 25 (1996) (“The written description part of the specification itself does not delimit the right to exclude.
 26 That is the function and purpose of claims.”). Words of a claim are to be given their “ordinary and
 27 customary meaning,” in light of the understanding of a person of ordinary skill in the art in question at
 28 the time of the invention. *Innova*, 381 F.3d at 1116. A person of ordinary skill in the art, however, is

1 deemed to read the claim term “not only in the context of the particular claim in which the disputed term
2 appears, but in the context of the entire patent, including the specification.” *Phillips v. AWH Corp.*, 415
3 F.3d 1303, 1313 (Fed. Cir. 2005); *see also Medrad, Inc. v. MRI Devices Corp.*, 401 F.3d 1313, 1319
4 (Fed. Cir. 2005) (“We cannot look at the ordinary meaning of the term . . . in a vacuum. Rather, we must
5 look at the ordinary meaning in the context of the written description and the prosecution history.”).

6 “Quite apart from the written description and the prosecution history, the claims themselves
7 provide substantial guidance as to the meaning of particular claim terms.” *Phillips*, 415 F.3d at 1313;
8 *see also Vitronics*, 90 F.3d at 1582; *ACTV, Inc. v. Walt Disney Co.*, 346 F.3d 1082, 1088 (Fed. Cir.
9 2003) (“[T]he context of the surrounding words of the claim also must be considered in determining the
10 ordinary and customary meaning of those terms.”). “Because claim terms are normally used
11 consistently throughout the patent, the usage of a term in one claim can often illuminate the meaning
12 of the same term in other claims.” *Phillips*, 415 F.3d at 1313.

13 14 DISCUSSION

15 Lockheed’s overarching argument is that the Federal Circuit necessarily construed the claims
16 of the ’375 patent when it evaluated SSL’s appeal of this Court’s summary judgment order. The Court
17 cannot agree with this interpretation. In support of its argument, Lockheed cites only to the Federal
18 Circuit’s general description of the ’375 patent, which the Court has in large part quoted above. Def.
19 Br. at 8. Conspicuously absent from the Federal Circuit’s opinion is case law discussing the process of
20 claim construction, or reference to standard claim construction materials, such as the patent’s
21 prosecution history. Indeed, aside from the patent itself the Federal Circuit does not mention any of the
22 materials that this Court considered in its claim construction order, or even the order itself. Thus, the
23 Court rejects Lockheed’s claim that the Federal Circuit construed the claims of the ’375 patent when
24 it reversed this Court’s written description order.

25 Nonetheless, while the Federal Circuit’s opinion is not controlling on this Court’s claim
26 construction, the Federal Circuit’s opinion is undoubtedly relevant and influential. And it is clear from
27 this Court’s review of the Federal Circuit’s opinion that the Federal Circuit understood the ’375 patent
28 to disclose an invention in which the first thruster firing was modulated in response to the estimated,

1 “prebias,” correction, without taking actual error into account. For example, the Federal Circuit wrote,
2 the satellite *first estimates the probable correction based on historical data from prior*
3 *station-keeping maneuvers*, and conducts a first firing of the thrusters based on the
4 estimated correction. This is called the “prebias” step of the modulating response. *After*
5 *the prebias firing, the satellite measures the remaining actual error in its position, adds*
6 *the actual error to the historical error, and conducts a second firing*. This procedure
7 overall uses less fuel than the prior method whereby a first firing was calculated to
8 attempt full correction, followed by a second firing. The fuel saving that is achieved
9 extends the life of the satellite.

10 Riley Decl., Exh. 4, at 3 (emphasis added). In the rest of the opinion, the Federal Circuit was fully
11 consistent with this interpretation of the ’375 patent. After describing the sequence leading up to the
12 second firing of the thrusters, in which “[t]he actual error information and the prebias or historical error
13 information are both fed into the summer,” the Federal Circuit stated, “[t]hese are the two outputs of the
14 error detection system used to modulate the thrusters; the prebias information is fed directly into the
15 pulse-width, pulse frequency (PWPF) modulating devices, col. 6, lines 30-35, and the sum of the actual
16 and historical error from [the summer] is also fed into the PWPF modulating devices. *Id.* Thus the
17 thrusters are modulated by both the historical (prebias) information and by the sum of the actual and
18 historical information.” *Id.* at 5. Thus, the Federal Circuit understood the patent to disclose two
19 thruster-firing steps in the station-keeping process, the first based only upon prebias error and the second
20 based in part upon the satellite’s actual error.

21 The Federal Circuit’s opinion is not the only evidence in support of this Court revisiting its prior
22 claim construction order. Lockheed has also made a convincing argument that this Court’s current claim
23 construction is internally inconsistent. As it stands, step [b] of claim 1 is construed as “modulating in
24 response to the stored value without reference to or depending upon net position error.” Because “net
25 position error” – the remaining actual error in the satellite’s position – arises only after the thrusters fire,
26 the phrase “without reference to or depending upon net position error” is superfluous; it is by definition
27 impossible to detect or rely on “net position error” before the thrusters fire.

28 Based on the above, the Court believes that its claim construction should be revisited. Lockheed
suggests two alternative options: First, the court could re-adopt its initial claim construction and prohibit
step [b] from utilizing “any position error”; second, the Court could remove the timing restriction on
its construction of “net position error,” that the error only exist after the thrusters fire. The Court finds

1 the former approach to be preferable.

2
3 **1. Construction of “Net Position Error”**

4 In both its claim construction orders, this Court has consistently interpreted “net position error”
5 to mean “attitude error arising after a modulated firing of a thruster pair, and is indicative of a difference
6 between an estimated disturbance torque and an actual disturbance torque.” Given the description of
7 “net position error” in step [c] of claim 1, the Court continues to believe that this interpretation is the
8 most sensible. *See* ’375 patent, col. 9, lines 25-28 (describing “net position error” in step [c] as “being
9 indicative of a difference between said estimated disturbance torque and said actual disturbance
10 torque”). Moreover, the Federal Circuit appears to have accepted this definition. *See* Riley Decl., Exh.
11 4 at 6 (“[Dr. Kaplan] explained that only after the firing maneuver starts does net position error exist.”).
12 Thus, the Court declines to revisit its construction of “net position error.”

13 Lockheed argues that the Court should change its construction of “net position error” because
14 the current construction renders a portion of step [b] superfluous. Specifically, Lockheed contends that
15 the phrase “without initially detecting said net position error” has no meaning under the Court’s current
16 construction, given that “net position error” as currently defined cannot exist until after the thrusters fire.

17 The Court disagrees with Lockheed’s reading of step [b]. Lockheed reads the quoted language
18 in isolation, and as a concrete limitation on the modulation process of step [b] that prohibits the
19 measurement of “net position error” before the first modulation takes place. Under this interpretation,
20 it is indeed superfluous to explicitly bar “net position error” from being measured before net position
21 error can exist. Rather than reading the language as an explicit bar, however, the Court believes that
22 the language is best read in the abstract and in connection with the preceding phrase, as a statement of
23 the purpose of the first modulating step. Thus, the Court believes the disputed language is best
24 interpreted as follows: “[The first modulating step is performed] in order to minimize a net position error
25 without initially detecting said net position error.” Read in this way, the language serves to make clear
26 the manner in which the claimed invention differs from the prior art – the prior art minimized net
27 position error by detecting it and reacting to it, while the current invention initially minimizes net
28 position error without detecting it. This interpretation of the disputed language gives the most sensible

1 meaning to net position error without rendering any portion of the patent's claims superfluous.

2
3 **2. Construction of Step [b]**

4 In its original claim construction order, the Court found that the prosecution history of the '375
5 patent created a limitation in step [b]. Specifically, the Court found that the inventor's statement during
6 prosecution of the patent that "the invention generates a counter-torque which does not depend on a
7 detected position error" was made to overcome a prior art rejection, and therefore prohibited the
8 modulation in step [b] from relying on "position error in general." In its second claim construction
9 order, however, the Court changed this construction, finding that nothing prohibited the first modulation
10 step from relying on position error in general. The Court reached this conclusion based on its
11 determination that the claim language and the patent's specification supported a broader reading of the
12 first modulating step. The Court then found that the inventor's statement during patent prosecution was
13 not sufficiently explicit to overcome the claim language and specification and to place a limitation on
14 the claims.

15 As is evident from the fact that this is the Court's third claim construction order, the questions
16 presented in this matter are close, and the patent is by no means a model of clarity. But given the
17 Federal Circuit's understanding of the patent, the Court no longer adheres to the view that the patent's
18 claims and specification support plaintiff's proposed construction. To the contrary, the Federal Circuit
19 found support in the specification for its view that the first modulating step was based on estimated,
20 historical error alone. *See* Riley Decl., Exh. 4 at 5; *see also Phillips v. AWH Corp.*, 415 F.3d 1303, 1317
21 (Fed. Cir. 2005) ("It is therefore entirely appropriate for a court, when conducting claim construction,
22 to rely heavily on the written description for guidance as to the meaning of the claims."). This view,
23 combined with the patent inventor's consistent statements during the prosecution of the patent, which
24 were made to overcome a prior art rejection, convince the Court that step [b] should be limited to
25 modulating in response to the stored value without referencing or depending upon any position error.
26 Accordingly, the Court will revert to its original construction of step [b].

27 SSL raises three arguments against this interpretation. First, it argues that the Court is
28 erroneously reading the word "exclusively" into step [b], so it would read "modulating [exclusively] in

1 response to said stored value.” While it is generally error to read a limitation into a claim from the
2 specification, it is not error to do so when a patent’s specification and prosecution history make clear
3 that the inventor intended his invention to be limited. *See Seachange Int’l, Inc. v. C-COR, Inc.*, 413 F.3d
4 1361, 1372-73 (Fed. Cir. 2005). Here, the patent’s inventor distinguished the prior art based on his
5 invention’s use of a prebias. In doing so, he emphasized that “the invention generates a counter-torque
6 which does not depend on a detected position error.” Riley Decl., Exh. 7 at 8-9; *see also id.* at 9 (“[T]he
7 Cavanaugh control system reacts to a man[eu]ver during a man[eu]ver, whereas the present invention
8 involves the step of reacting to an *unmeasured, estimated error prior to any measurement.*”) (emphasis
9 added). Because of its new understanding of the patent’s specification, the Court once again believes
10 the inventor’s statements are sufficient to limit the patent’s scope.

11 SSL’s second and third arguments are closely related, as both are based on the specification’s
12 disclosure of a “single feedback loop” used for both thruster modulations. SSL argues that because
13 “actual error information and prebias or historical error information” are summed in the single feedback
14 loop, they must necessarily be summed during both thruster modulations. *See* Riley Decl., Exh. 4 at 5
15 (“The actual error information and the prebias or historical error information are both fed into the
16 summer . . . where they are added together or summed.”). Thus, SSL argues that a person of ordinary
17 skill in the art would understand the first modulating step to be based on actual error because the single
18 feedback loop must necessarily include actual error data. For the same reason, SSL argues that
19 Lockheed’s proposed construction would exclude a preferred embodiment of the invention. *See Anchor*
20 *Wall Sys. v. Rockwood Retaining Walls, Inc.*, 340 F.3d 1298, 1308 (Fed. Cir. 2003) (“[I]t is axiomatic
21 that a claim construction that excludes a preferred embodiment such as the circular protrusions disclosed
22 in Figure 3A ‘is rarely, if ever correct and would require highly persuasive evidentiary support.’”).

23 The Court disagrees with SSL; a single-feedback-loop embodiment would still be entirely
24 possible under this Court’s construction. The “single feedback loop” would simply not contain any
25 actual error data during the calculation of the first modulation, but would contain actual error data
26 during the second modulation. The patent contemplates this result; because of a delay caused by
27 processing the actual error data, the specification makes clear that in the preferred embodiment the
28 prebias is utilized immediately, without actual error information, and that the actual error information

1 is only utilized later. *See* '375 patent, col. 5, lines 15-18 (“[The] prebias command [is] directed into
2 the modulation control system of the thrusters thereby to overcome the time delay associated with real-
3 time generation of initial position error signals.”); '375 patent, col. 5, lines 24-27 (“The force calibration
4 factor is applied as a prebias command bypassing the servo loop time delay associated with the position
5 sensor.”). Thus, the Court’s construction is entirely consistent with the preferred embodiment.

6 7 CONCLUSION

8 For the foregoing reasons and for good cause shown, the Court hereby GRANTS Lockheed’s
9 motion for reconsideration of claim construction (Docket No. 659). The Court’s construction of “net
10 position error” remains unchanged, but the Court reverts to its original construction of step [b]:
11 “modulating in response to the stored value without referencing or depending upon any position error.”

12 **IT IS SO ORDERED.**

13
14 Dated: September 19, 2006



15
16 SUSAN ILLSTON
United States District Judge